

Creating US Census Kiosks

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The following instructions will describe the process for creating a Public Service Kiosk for the 2020 US Census. These instructions may be used for creating application terminals for other websites with one simple change that will be described later. Creating special application terminals that are limited to only a single website offers a variety of advantages:

1. You don't have to worry about malware from e-mail or other websites affecting user data that's submitted to the US census.
2. Having a single application terminal means that it won't get tied up by patrons who try to open their e-mail or go to Facebook after filling out their Census form.
3. A simple web terminal can run on inexpensive hardware. If you have a spare table and monitor to use, the hardware for the kiosk typically runs less than \$220, and the software is Open Source.

Materials

Operating System: the system described here uses Porteus Kiosk Linux, which may be downloaded from <https://porteus-kiosk.org/download.html>. Be certain to get the Kiosk version of the software, as the Cloud, ThinClient and Server versions do not work with these particular instructions.

Hardware

Porteus Kiosk Linux works well with either a BRIX Micro-PC or an Intel NUC. The Porteus Linux website states: "Porteus Kiosk works with Intel/AMD processors only. Raspberry Pi and other ARM SBCs are not supported." Information on Porteus Kiosk hardware requirements may be found here: <https://porteus-kiosk.org/index.html#requirements>. You will not need an i7 processor and 16 Gigs of RAM for a web-kiosk, it is recommended that you purchase the least expensive kit that you can find for this particular application. Barebones kits for these machines are available for less than \$150.

"Bare-bones kit", means you get a case and a motherboard with a CPU. You'll will need to purchase SODIMM Memory chips and a hard-drive. Review the specifications of the kit you purchase to ensure you get the right product. Also note that if you plan to use a spare monitor that you already have sitting around, that you'll need to make sure you get a unit that has the correct video output to work with that monitor. Every new Brix or NUC unit you find will have an HDMI video output. some

still have a VGA output as well. You won't find a unit that has a VGA output but no HDMI unless you're buying a deadstock unit that's on clearance, or you purchase a used/refurbished unit.



GIGABYTE (89)
GIGABYTE BRIX GB-BXBT-2807
(rev. 1.0) Black Mini-PC
Barebone

The Gigabyte BRIX model shown at the left is recommended for this project. Avoid purchasing the “low profile” units that have a silvery-gray casing and require an “M.2” style hard drive, as those models can be extremely finicky and difficult to deal with.

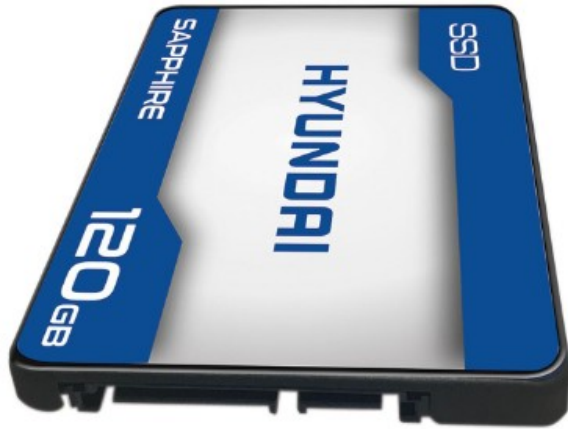
“SODIMM” refers to the format of memory chips typically used in laptops and Micro-PCs. When purchasing SODIMMs, the DDR number is very important. If the micro-PC you purchase specifies that it requires DDR3L RAM, then you must get DDR3L chips. The number of PINS on the chip varies according to the DDR specification, so if you get the wrong chip, it won't fit into the board that you have. You also need to make sure that you purchase SODIMMs that have the correct RAM speed. The RAM speed is indicated by the number following the “DDR” number. In the example at the right, we have a 4Gig, DDR3L, 1600 SO-DIMM. You need to check the specs for the board on the Micro-PC that you purchase to ensure your RAM is compatible. The “L” at the end is very important. It means that the chip is “low voltage RAM” that operates at 1.35 Volts. Regular DDR3 ram (without the “L” designation) runs at 1.5 volts. Some Micro PCs will not boot with 1.5 volt RAM.



CORSAIR (8)

CORSAIR ValueSelect 4GB 204-Pin DDR3 SO-DIMM DDR3L 1600 (PC3L 12800) Laptop Memory

Hard drives for Micro-PCs come in several different formats. For the sake of convenience, it is recommended that you purchase a Micro-PC that works with a 2.5” SATA hard drive. That’s the same format of hard drive that’s used in most laptop computers. Avoid units that say they require an “M.2” hard drive chip, as these devices can be extremely finicky and difficult to work with.



The SATA-3 hard drive at the left was being sold on NewEgg for only \$20.

The Brix Micro-PC and Intel NUC are very popular in the DIY community, and there are numerous tutorials on Youtube to show you how to unbox the items and assemble the components. Using a Youtube search string like “unbox assemble Brix Micro-PC” will yield a variety of tutorials to choose from. Once you've assembled your hardware you can move on to creating your USB installer.

Software

If you are using a Linux computer, you can create your installer using Imagewriter. Just plug in your USB, start imagewriter, select the Porteus Kiosk image file that you downloaded, select your usb drive and click the “Write” button to write the files to the drive. Keep in mind that all other files on the drive will be wiped when you complete this process.

The Porteus website recommends using [Win32DiskImager](https://sourceforge.net/projects/win32diskimager/) to create your USB installer. The link to download that program is here: <https://sourceforge.net/projects/win32diskimager/>. After installing Win32DiskImager note that “Image file” refers to the .iso installer file that you downloaded from the Porteus website. “Device” refers to the USB drive that you are writing your installer image to. Once you see the message that the image has been written, go to *Start > Computer > (usb drive letter and name) > Right click and Eject*. Do not pull the drive while the imaging software is writing to the drive, or pull the drive without ejecting it properly or your installer will end up useless and your thumb drive will need to be reformatted.

The Installation process

Begin by reading through the tutorial on the Porteus Kiosk website on the Installation Wizard. That tutorial is available here: <https://porteus-kiosk.org/wizard.html>. Keep in mind that many of the settings that are addressed in this tutorial are not relevant to the configuration we're using for the census kiosk project.

Connect the Micro-PC to its power source, a monitor, keyboard, mouse and an ethernet cable that's plugged into a router. Plug your USB installer into one of the ports on the machine and press the power button. When you get to the stage where you are applying settings, apply all of the settings according to the following list:

Porteus Kiosk Wizard settings for library Census Terminals

Select Ethernet connection

Configure connection using DHCP

Delete manual configuration sample info so lines are blank then hit "Next"

Select Mozilla Firefox Browser, select "OK" and wait for it to download and install

Launch Kiosk Wizard

Remote kiosk management: disable

Porteus Kiosk server: disable

Firewall: Enable

ICMP Protocol: Disable

URL Filter: Whitelist: census.gov

Wake on LAN: Disable

Hostname aliases: Disable

Kiosk hostname: Disable

Homepage: Enable: (enter URL provided by commerce department for people to fill out the census)

Private mode: Enable

Persistence: Disable

Browser idle time: Enable: 5 minutes: Yes

Managed bookmarks: Disable

SSL Certificates: Disable

Popup windows: Disable

Zoom controls: Enable

User agent: Disable

File browsing: Disable

Browser preferences: Disable

Navigation bar: Enable

Autohide navigation bar: Disable

Address bar: Disable

Leave all of the System Settings at defaults except for:

Shutdown menu: Enable

The settings that are not included in the list above should be left at their defaults. Follow the on-screen prompts, and after you get the message that settings have been written to the drive and you need to restart the machine, you can pull the USB drive as soon as the screen goes dark during the restart process. Porteus Kiosk Linux does not have an install limit so if you make an error and need to reflash the hard-drive you can repeat this process as needed. You can also experiment with changing other settings to create a customized local application, and if things don't work out as you'd like then reflash the computer and apply settings as they are listed above.

Although the tutorial for Kiosk linux mentions printing and other functions, those features have been disabled in this particular setup for the purpose of patron privacy. If the Commerce Department announces that they'll be adding a "census receipt" that they want users to print, then I will create a revised version of this report describing how to configure a printer. For patron security and privacy, any printing should be done to a local machine that is plugged directly into the Brix or NUC, and not on a wireless or network printer.

Future versions of these instructions will include a revision date, and a changelog describing what changes were added to the instructions on prior dates.

Revisions Changelog

09/30/2019: Updated specifications and clarified language regarding DDR3L RAM chips

10/15/2019: Updated advice on purchasing a hard drive